

SENSORY EXPERIENCES IN THE EARLY
CHILDHOOD CLASSROOM:
TEACHERS' USE OF ACTIVITIES,
PERCEPTIONS OF THE IMPORTANCE OF
ACTIVITIES, AND
BARRIERS TO IMPLEMENTATION

By

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This study was conducted to provide much-needed research documenting sensory experiences in Early Childhood classroom: teachers' use of activities, perceptions of importance of activities, and barriers to implementation.

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CHAPTER I

INTRODUCTION

Young children develop cognitively when they have numerous opportunities to explore the world around them, interact with others, and play. Sensory materials like play dough, sand, and water provide enjoyable and satisfying experiences for young children, but they are not merely “fun” activities. Rather, sensory activities provide valuable, hands-on, active learning experiences and support children’s growth and learning in multiple domains. Through sensory experiences, teachers can address early learning standards and observe children’s progress in many areas of development.

Standards delineated by the National Association for the Education of Young Children (NAEYC) support the facilitation of cognitive development through the provision of rich sensory experiences in early childhood classrooms. The NAEYC Accreditation Criteria for Physical Environment Standard 9.A.04 states that for all age groups (universal, infant, toddlers/twos, preschool, and kindergarten): A variety of age- and developmentally appropriate materials and equipment (should be) available indoors and outdoors for children throughout the day. Specifically, sensory materials such as sand, water, play dough, paint, and blocks are listed in the criteria (NAEYC, 2006).

The state of Oklahoma is consistently recognized as a leader in the field of early childhood education. Along with the inception of universal pre-kindergarten and the expansion of Head Start and Early Head Start in cities such as Tulsa has come an

increased focus on best practices in service delivery. The Oklahoma State Department of Education (2003) has developed the Priority Academic Student Skills (PASS), which include curriculum guidelines for pre-kindergarten. Additionally, the Oklahoma Department of Human Services, division of Child Care, has developed the Early Learning Guidelines for children ages three to five; these guidelines align with OK PASS as well as Head Start Performance Standards. Combined, these guidelines recognize the salience of sensory activities, link such activities to developmental domains, and provide suggestions for use of sensory activities in the early childhood classroom to facilitate young children's development. For example, the Early Learning Guidelines suggest that "creative skills can be developed by engaging children in activities with play dough, sand, water, dramatic play, blocks, creative stories, art, music, movement, and a variety of other materials" (Oklahoma Department of Human Services, 2007, p. 12).

Definitions

Any material that stimulates the senses, especially the sense of touch, is considered a *sensory material*. Examples include sand, water, shaving cream, sandpaper, and play dough. Any activity that engages children's senses is considered a *sensory activity*. Examples include sand table play, water play, listening to music, and dancing.

Problem Statement

Helping a child learn through sensory activities is a meaningful educational strategy, supported by state and national guidelines for developmentally appropriate practice in the early childhood classroom (e.g., OK PASS, OK Early Learning Guidelines; NAEYC Standards). However, sensory materials are not used often enough in early childhood classrooms. Some early childhood teachers do not perceive that using

sensory materials to help children learn is vitally important and necessary. Furthermore, many teachers believe sensory materials are too messy, time consuming, and unproductive. Without access to sensory materials and activities, children's development is not optimally facilitated. Children who are given little opportunity to explore and experiment with their environment may fail to develop the necessary neural connections and pathways that facilitate later learning (Shonkoff & Phillips, 2000). Children who have difficulty achieving academically are at an increased risk for school drop out, gang activity, violence, depression, and drug use (National Research Council and Institute of Medicine, 2000). Thus, early learning experiences that incorporate sensory activities are important for young children's development, and can potentially have both short- and long-term direct and indirect implications.

Purpose of the Study

The present study would provide much-needed research documenting teachers' use of sensory experiences with young children. Very little is known about early childhood teachers' perceptions of the importance of sensory activities or their use of sensory materials in the classroom. In addition to making a contribution to the existing literature, this study could provide important information to local practitioners; such information could in turn influence the way child care centers, family child care homes, and preschools develop and implement their curriculum, routines, and activities. By identifying areas in the classroom where sensory experiences can be explored above and beyond typical sensory activities such as sand and water play to include music, movement, creative art experiences, block play, and outdoor play, early childhood

educators can enrich their classroom environments and in turn enrich the learning experiences of young children.

Research Questions

The present study addressed five research questions. The first research question to be explored was “What are teachers’ perceptions of the importance of sensory experiences?” A second question asked, “How frequently do teachers provide sensory experiences in their classrooms?” Developmentally Appropriate Practice suggests that children be exposed daily to a variety of sensory experiences. The third research question asked, “What kinds of sensory materials and activities do teachers provide?” The fourth research question was “What are teachers’ perceived barriers/challenges to providing sensory experiences?” This question offered insight into why teachers who perceive sensory experiences to be important do not provide them in their classrooms. The fifth research question to be addressed was “How are teacher characteristics and use of sensory activities related?”

CHAPTER II

REVIEW OF LITERATURE

Theoretical Framework

Piaget's constructivist theory of development postulates that children act on their environment to construct an understanding of how the world operates. The theory also emphasizes the need for children to be actively involved in constructing knowledge of their physical environment (Piaget, 1952). Children need to explore, experience, and receive feedback from their actions on objects in order to move from the sensorimotor stage to representational and formal operations. The environment is a crucial factor, as children construct knowledge by handling tangible objects and using their senses to learn through hands-on experiences (Sobe, 2004).

According to Piaget (1952), children pass through four stages of cognitive development, including the sensorimotor, preoperational, concrete operational, and formal operational stages. The sensorimotor and preoperational stages are relevant to the focus of early childhood classrooms. The concrete and formal operational stages apply to older children. The sensorimotor stage begins at birth and lasts until about age two. In this stage, children learn by reacting to what they experience through their senses of touch, taste, hearing, sight, smell, and physical activity. Piaget divided sensorimotor development into six sub-stages in which progressively more complex patterns of

intellectual behavior evolve. It is in sub-stage 3- Secondary Circular Reactions (4 to 8 months) when infants actively experience the effects their behaviors have on external objects. Infants begin to link the association between behaviors and sensory consequences (Piaget & Inhelder, 1969; Wadsworth, 1996).

The second stage of cognitive development, preoperational, begins at about age two and lasts until about age seven or eight. Piaget believed that children learn best when they are actually doing the work themselves and creating their own understanding of what is going on, instead of being given explanations by adults. Children build upon their sensory experiences and begin to use symbols, language, and reflections to gain knowledge (Cohen & Kim, 1999). As children grow up, they gain more experience with direct, physical knowing, and they mature internally so that they are increasingly freed from having to carry out direct physical behavior in order to know something. They become able to produce mental images and *symbols* (e.g., words, mathematical figures) that represent objects and relationships (Piaget, 1952).

To further explain the roles of sensory information and reason, Piaget identified three kinds of knowledge. The three kinds of knowledge are physical, social (conventional) and logico-mathematical knowledge (Kamii & Ewing, 1996). Physical knowledge is knowledge of objects in external reality. Holidays, written and spoken languages are examples of social knowledge. Logico-mathematical knowledge consists of relationships created by each individual. It is in these relationships that knowledge is constructed. As children acquire knowledge through their senses, this knowledge is assimilated into the schemes that the child has previously constructed. Until children construct a certain level of logic at ages 4-16 years, they can base their judgment only on

what they can see (Kamii & Ewing, 1996). The present study will provide information about use of activities in the classroom, which can serve as a means of facilitating children's construction of physical, social, and logico-mathematical knowledge.

Maria Montessori also believed that children learn best through sensory experiences. Montessori's period of unconscious absorbent mind and absorbent mind corresponds closely with Piaget's sensorimotor and preoperational stages of development. From birth until about three years of age, the child is in the phase of the unconscious absorbent mind, during which time the child explores the environment through the senses and through movement (Montessori, 1984).

At about the age of three years, according to Montessori, the child's capacity for absorption shifts to a more conscious, purposeful type. At this point the child becomes a factual explorer, as well as a sensory explorer, noting relationships between things and making comparisons. The child begins to classify and refine sensory experiences, bringing to consciousness many impressions that were previously absorbed. In so doing, he constructs his mind until it becomes capable of "memory," the power to understand and the ability to think. This process evolves throughout the period of the "conscious absorbent mind," approximately between the ages of three and six years (Montessori, 1984).

The Montessori learning environment for 3 to 6 year olds is generally divided into four basic areas: practical life, sensorial (materials focusing on one or more of the senses), language, and mathematics. Music, art, movement, and drama are also included in the curriculum (Montessori, 1984). Sensorial materials are a series of sequenced exercises, aesthetically pleasing and seemingly simple in design. The children use these

materials to catalog and classify sensory impressions. These activities refine and sharpen the senses and create a sensory foundation for further intellectual development. The emphasis of Montessori's and Piaget's theory on hands-on, sensory experiences as the vehicle for knowledge construction provides the theoretical foundation for the present study.

Sensory Materials

Providing sensory materials indoors as well as outdoors offers children the opportunity for hands-on, self-directed, and self-centered activity, as well as an opportunity to learn. Any material that stimulates the senses, especially the sense of touch, is considered a sensory material. Sensory materials such as play dough, shaving cream, cornmeal, and grains provide numerous occasions for exploration and experimentation.

Sensory experiences facilitate development in multiple domains. Sensory materials encourage cognitive development. As children manipulate the materials, they learn to understand concepts such as more/less, full/empty, and sink/float. Children learn math skills such as size, conservation, counting, matching, classifying, and sorting (Guha, 2002). Children reinforce and practice their large and small motor skills as well as eye-hand coordination while pouring, molding, stirring, sifting, sorting, measuring, lifting and carrying sensory materials. Using descriptive words such as hard/soft, rough/smooth, liquid/solid, hot/cold to describe sensory materials helps children to expand their vocabulary.

Sensory experiences also provide children with a chance to build confidence and self-esteem as they use their decision-making skills. There is no right or wrong way to

use the materials. Many children find sensory materials calming and soothing. Sensory materials can be used to help children manage feelings of anger and anxiety (Chilvers & Cole, 2006).

Much of the available literature related to sensory activities is very practical in nature, offering strategies for incorporating sensory activities into the early childhood classroom. These sources suggest that as children handle, manipulate, taste, touch, hear, and observe, they develop creative ideas and make discoveries (Krustchinsky & Weiss, 1991; Whaley, 2005; Wilcox, 1994). Prestia (2004) suggests that when sensory choices are incorporated into the classroom activities and environment, children can choose what their bodies need in order to continue learning. For example, adding texture to paint with oatmeal or allowing a student to stand or lie on the floor, and pairing verbal directions with visuals are sensory-specific strategies for facilitating learning.

Sensory Experiences and Early Childhood Education

Empirical research on the use of sensory activities with young children is limited. Much of the research that does exist focuses primarily on children with special needs. In short, research in the field of early childhood special education shows the benefits of providing sensory experiences to meet children's individual needs (Howe, Brittain, & McCathren, 2004; Lynch & Simpson, 2004). A study focusing on children with behavioral challenges found that an enriched sensory environment benefited the children (Chilvers & Cole, 2006). A special sensory room was filled with a variety of sensory resources for children who demonstrated feelings of anxiety or anger and needed a "special place." A mood lamp, bubble tube, fiber optic display, projector, aromatherapy, massage, and music were used to create an overall "sensory environment." A "sensory

record” was kept on each child visiting the sensory room. Reactions to the sensory room were positive, and the program helped many of the children improve their self-esteem and general emotional well-being (Chilvers & Cole, 2006).

As previously mentioned, research examining sensory experiences in early childhood education is sparse. Piaget’s description of the sub-stages of sensorimotor development based on observations of his children remains the most detailed and comprehensive account of the nature of early play, its developmental progression, and its link to cognitive development. One study, however, is framed from a Piagetian perspective and provides support for the present project. A study by Staley (1997) examined the effects of sensory experiences on typically-developing toddlers’ knowledge of colors. Staley suggests that multisensory experiences help children to define colors, and children need these experiences to construct their own knowledge and to develop concepts of their world. Although most teachers limit experiences with color to what is visual, color can be experienced through other senses as well. By immersing children in an environment enriched with a wide variety of experiences, children can construct their own knowledge of color. Children can connect meaning to ideas of color by using their senses of smell, touch, and taste, as well as sight.

Staley (1997) and a colleague worked together to demonstrate the need to immerse children in experiences of color. They worked with a class of ten two-year-olds. The class studied one color each week, beginning with purple. Colors, scents, and flavors were matched up and presented to the children one at a time. The teachers painted colored containers and filled them with the different scents. After several colors had been learned, the children played an identification game by smelling and guessing the colors.

Another way that the toddlers were introduced to colors was by coordinating daily snacks with the current color being studied. The children were involved in the making of the snacks, which helped to enrich their experiences.

Other methods of immersing the students in color experiences included art, music, poetry, literature, and colored lights (Staley, 1997). Tables and rooms were decorated with coordinating colors. Because the toddlers loved to play dress up, the teacher provided color-specific outfits for an old bear. The items were changed regularly according to the specific color being explored. Other learning centers, such as a “store,” were stocked with color-specific items as well. The teachers enriched the toddlers’ understanding of color by asking the children to find items of specific colors that were in the store or hidden in other areas. To conclude the unit, the children marched through the school wearing color-specific outfits of their choice.

The project resulted in positive outcomes for children’s learning. The number of toddlers who knew all eight of the basic colors increased from four to ten (out of ten) from the beginning to the end of the project. Children used color names in conversation and could accurately identify colors by name (Staley, 1997). Additionally, parents reported satisfaction with the project and participated by providing food items and assisting with the culminating activity. Thus findings from this study support the use of multidimensional sensory activities to promote very young children’s development of basic knowledge.

In three studies conducted by O’Neill, Astington, and Flavell (1992), each study investigated young children’s understanding of the role that sensory experiences play in knowledge acquisition. In Study 1, 36 children ranging in age from three to five years of

age were tested to find out whether the children understood that the acquisition of certain types of knowledge depends specifically on the modality of the sensory experience involved. *Sight* and *touch* were chosen as the two sensory modalities to be investigated. Children's understanding was assessed by their ability to state correctly whether they would need to see or to feel an object in order to determine whether it had a given visual or tactile property.

The results showed that three-, four-, and five-year-old children perform well when "seeing" is the mode of informational access, but three-year-olds do not perform well when "feeling" is the mode of informational access. The three- and four-year-olds both performed significantly worse than the five-year-olds on all four experimental trials. They may have erred because they do not understand clearly what properties of an object are accessible through touch and what properties require seeing the object. They appeared to overestimate what could be learned from tactile experiences (O'Neill, Astington, & Flavell, 1992).

In Study 2, 48 children were asked to state which of two puppets knew that an object hidden inside a tunnel possessed a given visual or tactile property. The children were given a small introduction to the puppets (Ernie and Bert), the tunnel, and the task itself. The children were told that they were going to help the experimenter hide some toys inside the tunnel and that Ernie and Bert were going to take turns seeing or feeling what was inside. A pretest familiarized the children with the procedure of choosing one of the puppets in response to the experimenter's questions. A control task was used to assess if the children could easily distinguish between two actions of seeing or feeling what was inside the tunnel when the puppets performed them. The children, the

experimenter, and the puppets looked at and felt the pairs of objects until they all agreed that the two felt the same but looked different or looked the same but felt different. The puppets turned around and the child picked which object was to be placed in the tunnel. After the experimenter reinforced the properties by which the objects differed, the puppets performed the relevant actions. The children were asked to tell the experimenter which puppet--Ernie or Bert-- knew what was inside the tunnel.

The results of Study 2 showed that children three years of age and older performed well on primary knowledge assessment tasks (where only one of the puppets had visual or tactile access to the object hidden inside the tunnel) that involved seeing as the mode of informational access. Only children older than three years of age performed well on primary knowledge assessment tasks when feeling was the mode of informational access. On the see condition trials, four- and five-and-a-half-year-olds performed well for both primary knowledge assessment tasks and modality-specific knowledge assessment tasks (where puppets had either seen or felt the object hidden inside the tunnel). The three-year-olds performed above chance only for the primary knowledge assessment tasks. On the feel condition trials, four- and five-year-olds performed well for the primary knowledge assessment task, but at chance for the modality-specific knowledge assessment task, and three-year-olds performed at chance for both tasks (O'Neill, Astington, & Flavell, 1992).

In Study 3, 72 children were asked, in a scenario similar to Study 2, to state for each puppet whether he could tell, just by looking or by feeling, that the hidden object possessed a certain visual or tactile property. The two puppets, Ernie and Bert, were outfitted with either a blindfold to prevent them from looking at an object or with back

pockets into which their hands could be placed to prevent them from feeling an object. Six pairs of objects were used. Three pairs of objects felt the same but looked different and three pairs looked the same but felt different. This task consisted of six trials: three see condition trials and three feel condition trials, given in random order. Sixty-seven percent of the five-year-olds and 50% of the four-year-olds passed all six trials; only 4% of the three-year-olds did so. In addition, the results of this study found that focusing the task on the sensory experiences enhanced the performance of the four- and five-year-olds. The three-year-olds had difficulty with this task, even when it required only a rudimentary level of understanding (O'Neill, Astington, & Flavell, 1992).

Results of all three studies suggest that an appreciation of the different types of knowledge our senses can provide (i.e., modality-specific knowledge) develops between the ages of three and five. In the modality-specific task, children must understand which sensory experiences lead to which different types of knowledge. The level of understanding may depend on his or her experience and familiarity with exploring objects and the surrounding environment (O'Neill, Astington, & Flavell, 1992). These studies reinforce the importance of allowing young children opportunities to develop and use their senses in order to be able to distinguish the properties of objects in their environment.

Outdoor Play

Many activities typically offered indoors can be moved to the playground, where the numerous sounds, smells, sights, and feelings unique to the outdoors create a rich learning environment. Children experience sensory stimulation through access to natural play materials such as sand, water, grass, dirt, plants, and of course, fresh air (Rivkin,

1997). The outdoor environment gives children opportunities to explore, question, and develop theories about how things work. Outdoor play also offers various opportunities for socialization with other children and with adults, supporting the development of negotiation, language, and cooperation skills.

Playing in natural environments provides opportunities for sensory experiences and motor development not available in the classroom or even on traditional playgrounds. Rivkin (1997) noted that the younger the child, the more the child learns through sensory and physical activity. The variety and richness of natural settings: the life cycle of plants, the hardness of rocks, the varieties of colors and sounds, and the wide range of permitted behaviors (shouting, running, and climbing), all contribute to physical, cognitive, and social-emotional development. Materials such as pinecones, berries, nuts, and flowers should be made available for children's pleasure and investigation. Seeing such things is only part of learning about them. Touching, tasting, smelling, and pulling objects apart are also vital processes (Rivkin). Another lasting benefit of natural environments is that children can learn to care for the environment, when provided with numerous positive outdoor experiences (Woyke, 2004).

Music and Movement

Moving to music, dancing, playing instruments, and experimenting with materials that make sounds all foster the development of young children. "It's the doing, in addition to the listening, that offers the greatest positive benefit in all aspects of learning, especially in music" (Wilcox, 1999, p. 35). Music/movement is a powerful learning medium because it involves multiple senses: seeing, hearing, and touching. Developmentally, much is accomplished through music and its various forms: it promotes

social interaction, contributes to emotional well-being, enhances physical coordination, and aids in cognitive and language development (Bredekamp & Coople, 1997).

Zachopoulou, Tsapakidou, and Derri (2004) compared the effects of a developmentally appropriate music and movement program and a developmentally appropriate physical education program on the development of jumping and dynamic balance in children ages four—six. The study consisted of an experimental and a control group. The study was conducted over a two month period with each group meeting twice a week for 35-40 minutes. The experimental group followed the music and movement program, based on rhythmic education principles of the Orff approach. A large part of the program consisted of three types of movement: (a) percussion movements (e.g., clapping, patting knees with both hands, tapping floor with foot, etc.); (b) readiness and reaction movements; and (c) improvisation and creative movements. The children were taught rhythm elements of tempo, intensity, and accent, using percussion instruments. The temporal rhythmic symbols taught to children, were eighth notes (two movements in one beat), quarter notes (one movement in one beat), and half notes (one movement in two beats).

The control group followed the physical education program. The content of the exercises, which focused on jumping tasks, included activities for jumping and landing, jumping for distance, jumping for height, jumping over a rope or obstacles, and jumping with a partner to mirror actions or to match actions (Zachopoulou et al., 2004). Exercises to develop balance were based on activities for balancing on different bases of support; balancing on different body parts; moving in space and stopping in balanced positions; balancing while walking in various body positions; moving while using different parts of

the feet to touch the floor; and balancing while walking or running between or over cones/forms of equipment.

Results of the study showed that the experimental group improved significantly in both jumping and dynamic balance on the post-test measure compared to the control group. Through practice with certain fundamental movements, children begin to understand the structural elements of rhythm and are able to express this understanding through coordinated movements because moving to rhythm is an essential element of all coordinated movements (Zachopoulou, et al., 2004). This study illustrates the importance of music in fostering physical development.

Music also enhances math skills. Shilling (2002) explored strategies for helping young children explore mathematical concepts through experiences with beat, meter, duration of sounds, rhythmic patterns, and tempo. Bouncing rhymes provide young children with their first experiences with feeling subdivided beats, accompanied by the rhythmic patterns of the language. Chants were used to introduce rhythmic patterning by matching a set of rhythms to a set of actions. Nursery rhymes that have a clear steady beat pattern were used to reinforce the concept. Tempo was explored through the use of scarves. The children appeared to be fascinated by the way the scarf seems to float in the air when they move it rapidly or slowly, while matching their own body movement to the speed of the scarf. Teachers can capitalize on their interest in exploring temporal change by providing a variety of fast and slow music. Embedding mathematics in music activities provides a way for children to develop their logical/mathematical and musical/rhythmic intelligences (Shilling).

Wiggins (2007) discussed how meaningful music activities can be used in early childhood classrooms to enhance literacy and language development. She stresses that the ability to listen is keenly developed in musical settings. A key to successful language reading is the development of attentive listening. As children participate in music-integrated literacy lessons, which include reading stories, print symbols, singing, pretending to be characters of the story and playing musical instruments, their literacy skills are enhanced.

Music stimulates the senses and involves children at many levels, reaching them aesthetically and appealing to their emotions (Nichols & Honig, 1997). Young children can learn about their own feelings and moods through listening to music and singing songs. Children can become more in touch with their own feelings, as well as the feelings of others, through the harmonies found in music. Harmonies reflect how chords are put together and how they progress. It is this progression that can influence our moods. Music can sensitize children to moods as well as help children express their moods and feelings. As children listen to music they can express whether the composer or singer was feeling sad, joyous, perky, shy, dreamy, or angry (Nichols & Honig).

Movement is a sensory experience. Visual, auditory and kinesthetic senses are key sensations in movement through dance. These sensory skills facilitate awareness of response and reactivity to different conditions for the participant. Movement through dance facilitates motor skills. Participating in a group format also provides opportunities for social modeling and repetitive practice, promoting motor planning and sequencing skills. Dance techniques challenge children with new motor plans and sequences, increasing their repertoire of movements and facilitating developmental motor skills

(Lorenzo-Lasa, Ideishi, & Ideishi, 2007). Dance techniques also help children become more aware of their physical presence, spatial relationships, breathing, and timing and rhythm in movement (Sousa, 2006). It is, therefore, important for early childhood teachers to provide an environment rich with music and movement to allow for the exploration of sounds, musical instruments, singing, and dance.

Art

For very young children, art is a sensory exploration activity. Open-ended materials such as paint, crayons, markers, scissors, glue, play dough, and an assortment of paper provide opportunities where the “process” is more important than the “product.” How children use the materials is much more important than what he/she makes with them. Children can explore many art materials directly with their hands. Tree branches, shells, sponges, found objects or simple kitchen tools can easily become art accessories. Art activities foster children’s motor, cognitive and social development.

Making art helps children develop eye-hand coordination (Koster, 1997). As children decide how to make parts fit together into a whole, where to place objects, and what details to include, they learn to coordinate what they see with the movements of their hands and fingers. This eye-hand coordination is essential for many activities, including forming letters and spacing words in formal writing.

Art experiences also aide in the development of children’s formation of self-identity. Ahn and Filipenko (2007) documented six kindergartners’ descriptive narratives of their drawings, paintings, and three-dimensional objects. Videotapes and audiotapes of the children’s narrative talk were also collected. The narratives reflected the ways in which these children constructed meaning about their world and their place in it.

Narrative is an essential form through which children describe their own experiences and communicate their views of the world. The narratives created by these children revealed the self-identity forming process. Teachers in a developmentally appropriate classroom must recognize that children express their ideas and feelings through art. As such, teachers should make an assortment of art materials accessible daily to young children to help meet the needs of the whole child (Bredekamp & Coople, 1997).

Sousa (2006) suggests that schools that integrate the arts with subjects in the core curriculum are more effective than stand-alone arts programs. In schools where arts were integrated into the core curriculum, students were found to have a greater emotional investment in their classes; students worked more diligently and learned from each other; and cooperative learning groups turned classrooms into learning communities. Art and music teachers collaborated more and became the center of multi-class projects. The curriculum became more authentic, hands-on, and project-based as the teachers' expectations for their students rose. The arts play an important role in human development, enhancing the growth of cognitive, emotional, and psychomotor pathways in the brain.

Danko-McGhee and Slutsky (2007) focused on the professional development of early childhood and art education teachers. University students explored the many opportunities and ways of using art experiences to help students develop problem-solving, visual perception/discrimination, critical thinking and social skills. The "cloud project" was used to facilitate the learning experience.

The cloud project incorporated two components: a class discussion about clouds and a hands-on experience. First, the students discussed clouds and weather-related

conditions. Stories about clouds were read, such as *It Looked Like Spilt Milk* by Charles Shaw. Various art reproductions that included painting of clouds and books about clouds were also utilized. Then, the students explored ways of making their own clouds. Students were provided a variety of materials such as plastic bags, foam paint, an assortment of liquid watercolors, helium, and colored transparent and semi-transparent materials such as cellophane, feathers, and tissue paper. After choosing materials and cloud type they wanted to make (i.e. cumulus, stratus, cirrus, and nimbus clouds), the students made their cloud float by adding helium gas (Danko-McGhee & Slutsky, 2007).

The students made several key decisions during their cloud-making process involving collaborative social skills, language development, critical thinking, creativity, and science concepts. After the university students completed their projects, children ages two—eight were invited into the classroom to help the university students implement the “cloud project.” The university students worked with the children to identify their interests and helped them explore those interests through art experiences (Danko-McGhee & Slutsky, 2007). The cloud project enabled both the university students and children to construct their own ideas and use materials that are meaningful to them in their pursuit and construction of knowledge.

Research on the topic of sensory activities in the early childhood classroom is clearly narrow in scope. The limited research that exists suggests that sensory experiences are important for children’s development, thus the topic is a salient one for further study. A critical factor in providing sensory experiences to young children is the teacher. The role of the teacher, along with teacher characteristics, beliefs, and practices will be discussed next.

Role of the Teacher

Early childhood teachers and caregivers who embrace developmentally appropriate practices (DAP) create learning environments filled with hands-on, concrete materials that encourage exploration, discovery, manipulation, and active engagement of children. Children in developmentally appropriate learning environments are active constructors of their own understanding, who benefit from initiating and regulating their own learning activities and interacting with peers. Therefore, teachers should strive to achieve an optimal balance between children's self-initiated learning and adult guidance or support. Teachers must learn to follow the lead of the children and allow them to have some freedom to direct where the project or the experience may need to go next. Teachers can build on a child's interest by providing children with inviting props, asking appropriate questions, and scheduling ample time for children to work through their play ideas (Bredekamp & Copple, 1997).

Young children need exposure to a wide variety of learning experiences, including sensory experiences. Very little is known about how frequently early childhood teachers provide such experiences for young children. In reality, sensory experiences can present unique challenges for teachers. For example, sensory materials such as sand, water, and chalk are "messy"; musical instruments are "noisy"; and cooking can be "dangerous." However, early childhood educators are encouraged not to let these challenges become barriers, as avoiding experiences because they take time, are too messy, or require supervision means not providing strong learning opportunities for young children (Bredekamp & Copple, 1997). To date, little if any research exists pertaining to teachers' perceived barriers to offering sensory activities in the classroom.

Teacher Beliefs and Practices

Teacher practices appear to be deeply embedded within value and belief systems that are rooted in ethnicity, community, and social class (Shonkoff & Philips, 2000). Beliefs are formed from personal experiences, education, and values. Teachers' beliefs are often implicit and unarticulated, yet they influence teachers' perceptions, judgments, and decisions, and direct teachers to act in certain ways (Vartuli, 2005). Practices are the particular strategies that the teacher intends to and actually uses to enhance children's development. Previous research indicates that teachers' practices are associated with their beliefs (Buchanan, Burts, Bidner, White, & Charlesworth, 1998; Maxwell, McWilliam, Hemmeter, Ault, & Schuster, 2001; McMullen, 1999; Stipek & Byler, 1997).

There are several characteristics that may influence whether or not teachers use developmentally appropriate practices, including level of education and years of experience. The child care literature suggests that teachers with more education are more likely to implement developmentally appropriate practice (Cassidy, Buell, Pugh-Hoese, & Russell, 1995). Snider and Fu (1990) found that teachers in licensed centers with academic degrees in child development or early childhood education scored significantly higher on developmentally appropriate practice measures than teachers with other academic degrees. Teachers with degrees in child development/early childhood responded in a significantly more developmentally appropriate manner when asked to rate audio taped vignettes of teacher-child interactions as being appropriate or inappropriate when compared with teachers with academic degrees in other fields of study. Cassidy et al. (1995) found that teachers who completed at least 12 to 20 credit hours of community coursework demonstrated significantly more developmentally

appropriate beliefs and practices compared to a group of teachers who did not attend such college classes.

The school age literature has not revealed a relationship between level of education and implementation of developmentally appropriate practices (Buchanan et al., 1998). Vartuli (1999) studied practices of Head Start, kindergarten, first-, second-, and third-grade teachers and found that teachers with more years of teaching experience and higher educational levels were *not* found to use more developmentally appropriate practices. However, higher education levels do not guarantee that coursework covered developmentally appropriate practices. Teachers with less teaching experience were observed to use more developmentally appropriate practices. An additional finding that emerged from the literature was that as grade level increased, the level of self-reported developmentally appropriate beliefs and practice decreased (Buchanan et al., 1998; Vartuli, 1999).

Existing research supports the idea that teachers' beliefs influence their practice, and that practices are related to certain teacher characteristics. However, no research exists examining how teachers' perceptions of the importance of sensory experiences are linked to their use of sensory activities in the classroom. Furthermore, it is unclear how teacher characteristics such as level of education and years of experience are related to beliefs about sensory activities. Based on previous research, it might be hypothesized that the higher the level of education of the teacher, the more frequently they provide sensory experiences in their classroom. One could also hypothesize that teachers who hold degrees in early childhood or child development are more likely to use sensory experiences on a daily basis when compared to teachers with degrees in other areas.

CHAPTER III

METHODOLOGY

Participants

The participants in the study included teachers who work with children (birth to seven years) in licensed child care centers in an urban community in Oklahoma. Director letters were mailed out to 164 centers in the community with 12 centers responding for a response rate of 7%. The directors e-mailed the names of the teachers, grouped by classroom, to the primary investigator of the study. Each teacher received a survey packet that included a teacher letter requesting participation in the study and the questionnaire. A total of 172 surveys were delivered and 115 were returned and utilized in the study for a response rate of 67%.

The majority of participants in the study were women (97%). Three men returned surveys and were included in the study. The ages of participants ranged from 18 to 67 with the mean age being 38 years old. Marital status of participants was reported as 56% married or single with partner, 25% single (never married), and 19% single (separated, divorced or widowed). The ethnicity of the majority of participants was Caucasian (73%) with African-American and Native American equally represented at (10%), and Hispanic/Latino comprising .03% of the study population. The majority of participants have worked in early childhood programs more than ten years. Descriptive information about participants is shown in Table 1.

Table 1

Characteristics of Teachers (N = 115)

	Mean	\pm SD	Range
Teacher Age	37.52	12.88	18–67
n (%)			
Sex			
Female	112 (97)		
Male	3 (3)		
Marital Status			
Single (never married)	29 (25)		
Single (separated, divorced, widowed)	22 (19)		
Married or single with partner	64 (56)		
Teacher Race			
African-American	12 (11)		
Biracial or Multiracial	0 (0)		
Hispanic/Latino	4 (4)		
Asian or Pacific Islander	0 (0)		
Caucasian	84 (75)		
Native American	12 (10)		
Certification Type			
Early Childhood	2 (2)		
Elementary	2 (2)		
Highest Education			
Less than High School	0 (0)		
High School Diploma	14 (12)		
Vocational School	7 (6)		
Some College	40 (35)		
Two-year College	27 (23)		
Four-year College	25 (22)		
Some Graduate College	5 (4)		
Graduate Degree	3 (3)		

Table 1 (continued)

Characteristics of Teachers (N = 115)

n (%)			
Frequency of Professional Development			
Brain Development			
Yes		98 (86)	
No		16 (14)	
Sensory Activities			
Yes		85 (75)	
No		27 (24)	
Teaching Experience	Mean	\pm SD	Range
# Years any age	11.24	8.59	0–40
# Years infants/ toddlers	6.93	6.82	0–30

The levels of education of child care teachers were noted with the largest number of teachers (35%) having some college, while 23% reported having completed two-year college, and 22% completing four-year college. High School diplomas were held by 12% of teachers with only 3% having obtained a Graduate degree. Child Development Associate Credentials were held by 41% of participants; 25% in infant/toddler and 17% in preschool. A Certificate of Mastery was held by 15% of participants. Only two teachers reported having a certification in Early Childhood Education. A Certification in Elementary Education was reported by two teachers. Participants reported attending workshops/trainings about brain development 86%; 75% reported attending workshops/trainings about using sensory activities in the classroom.

Participants were asked to indicate field of study for degrees obtained. Two-year college respondents not only reported degrees in early childhood and child development but also in business, liberal arts, insurance, massage therapy, computer programming and deaf ministry. Four-year college participants indicated art education, business, psychology, religious education as well as early childhood education, elementary education and child development/ human development. The graduate degrees were reported to be in deaf education, elementary education with an emphasis on reading and education.

Procedures

Participation in the project was voluntary. The teachers were asked to complete the questionnaire. Center directors were asked to distribute the questionnaires to the teachers, along with a cover letter explaining the study (see Appendix A). Completed questionnaires were returned to directors in sealed envelopes (provided). The sealed envelopes were gathered for the study.

Instrument

The questionnaire was designed to gather information about sensory activities in the early childhood classroom (see Appendix B). The questionnaire tapped teachers' use of sensory materials (33 items), perceived importance of sensory experiences (8 items), and barriers to using sensory activities in the classroom (14 items). Demographic information about teachers was also gathered, including age, gender, marital status, ethnicity, education, certification, teaching experience, classroom characteristics, and professional development. The instrument was pilot-tested with 13 local early childhood teachers.

Data Analyses

To answer research questions one through four, descriptive analyses, including means, standard deviations, ranges, and frequencies were used. The response rate was not sufficient to warrant a factor analysis of sensory experience items. Furthermore, response rate did not allow for test-retest analysis using data from the pilot test. To answer the fifth research question, one-way ANOVA's were conducted to test for differences in use of sensory activities by teacher experience and level of education. The 33 sensory activity variables were condensed into seven composite variables (sensory table activities, outdoor play activities, music & movement, art materials & activities, visual stimulation, and distinguishing differences).

CHAPTER IV

RESULTS

Teachers' Perceptions of the Importance of Sensory Experiences

Participants were asked to respond to the eight questions regarding how important it is for teachers to provide sensory experiences on a scale from “Very important to Unimportant”. Participants in the study overwhelmingly reported that *in general*, it is “very important” to provide sensory experiences and activities to young children. Only 4% reported it to be “somewhat important”. When asked about individual importance of subgroups of sensory experiences and activities, the majority of participants stated that they viewed the areas of art materials and activities (95%), visual stimulation (94%) and outdoor plays activities (90%) as “very important”. Means, standard deviations, and ranges for teacher ratings of importance of sensory experiences can be seen in Table 2. Frequencies for teacher ratings of importance of sensory experiences can be seen in Table 3.

Frequency and Type of Sensory Activities Provided in the Classroom

Participants were asked to select the frequency with which they provided sensory experiences in the classroom (never to daily). Means, standard deviations, and ranges for teacher rating of use of sensory activities in the classroom can be seen in Table 4. Frequencies for teacher ratings of use of sensory experiences in the classroom can be

Table 2

Means, Standard Deviations, and Ranges for Teacher Ratings of Importance of Sensory Experiences (N = 115)

Sensory Experience	Mean	\pm SD	Range*
Sensory table activities	3.77	.46	2—4
Outdoor play activities	3.87	.43	1—4
Music & movement	3.86	.40	2—4
Art materials & activities	3.95	.22	3—4
Taste/smell activities	3.70	.48	2—4
Visual stimulation	3.94	.24	3—4
Distinguishing differences	3.81	.51	0—4
General importance of sensory activities	3.96	.21	3—4

* 0 = Never 1 = 1-2x/year 2 = 1-2x/month 3 = Once a week 4 = Several times/week 5 = Daily

seen in Table 5. Sensory experiences that teachers reported providing most frequently included: listening to music (93% daily), singing (91% daily), soft materials (88% daily) and gross motor activities (87% daily). Other activities were used much less frequently, including: woodworking (70% never), goop, gak, ookbleck (56% never) and smell jars (45% never). Participants were asked to write in (question #33) other sensory experiences that they provide in their classrooms. Responses included: jell-o-bags, sensory bottles, color tasting party, and sticky tape.

Table 3

Frequencies for Teacher Ratings of Importance of Sensory Experiences (N = 115)

Sensory Experiences	Very Important n (%)	Somewhat Important n (%)	Not Very Important n (%)	Unimportant n (%)
Sensory table activities	91 (79)	22 (19)	2 (2)	0 (0)
Outdoor play activities	103 (90)	10 (9)	1 (1)	1 (1)
Music & movement	101 (88)	12 (10)	2 (2)	0 (0)
Art materials & activities	109 (95)	6 (5)	0 (0)	0 (0)
Taste/smell activities	82 (71)	32 (28)	1 (1)	0 (0)
Visual stimulation	108 (94)	7 (6)	0 (0)	0 (0)
Distinguishing differences	96 (83)	18 (16)	0 (0)	0 (0)
General importance of sensory activities	110 (96)	5 (4)	0 (0)	0 (0)

Table 4

Means, Standard Deviations, and Ranges for Teacher Ratings of Use of Sensory Activities in the Classroom (N = 115)

Sensory Experience	Mean	\pm SD	Range*
Water play	2.44	1.25	0—5
Bubbles	2.93	1.27	0—5
Sand	2.43	1.84	0—5
Food in sensory table	1.54	1.42	0—5
Food in art	1.45	1.24	0—5
Playdough/Clay/Bread dough	2.85	1.73	0—5
Goop, gak, Oobleck	0.91	1.28	0—5
Shaving cream	1.44	1.21	0—4
Paint	3.74	1.15	0—5
Rubbings	1.24	1.26	0—5
Chalk	2.71	1.69	0—5
Color mixing	2.14	1.58	0—5
Fine motor tools	3.88	1.56	0—5
Smell jars	1.06	1.34	0—5
Cooking	1.29	1.17	0—4
Tasting	2.09	1.33	0—5
Distinguishing temperature	2.29	1.81	0—5
Distinguishing sounds	2.69	1.77	0—5
Distinguishing materials/objects/ textures in a bag	2.06	1.58	0—5

Table 4 (continued)

Means, Standard Deviations, and Ranges for Teacher Ratings of Use of Sensory Activities in the Classroom (N = 115)

Sensory Experience	Mean	\pm SD	Range *
Visual displays	4.54	1.05	0—5
Flashlights/Shadowing	1.57	1.42	0—5
Soft lighting	3.28	2.06	0—5
Listening to music	4.92	.30	3—5
Singing	4.88	.44	2—5
Musical/Rhythm instruments	4.45	.98	0—5
Movement	4.66	.91	0—5
Rocking chair	3.34	2.26	0—5
Soft materials	4.76	.81	0—5
Textured manipulatives and materials	3.09	1.78	0—5
Woodworking	0.73	1.41	0—5
Gross motor activities	4.77	.74	0—5
Nature experiences	3.20	1.40	0—5

* 0 = Never 1 = 1-2x/year 2 = 1-2x/month 3 = Once a week 4 = Several times/week 5 = Daily

Table 5

Frequencies for Teacher Ratings of Use of Sensory Experiences in the Classroom (N = 115)

Sensory Experience	Never n (%)	1-2 x Year n (%)	1-2 x Month n (%)	Once a Week n (%)	Several times a week n (%)	Daily n (%)
Water play	9 (8)	12 (11)	38 (35)	30 (27)	15 (17)	6 (5)
Bubbles	4 (3)	8 (7)	35 (31)	22 (19)	33 (29)	11 (10)
Sand	24 (21)	14 (12)	27 (24)	11 (10)	11 (10)	26 (23)
Food in sensory table	37 (32)	18 (16)	37 (32)	8 (7)	10 (9)	4 (3)
Food in art	35 (31)	21 (18)	38 (33)	14 (12)	4 (3)	2 (2)
Playdough/Clay/Bread dough	18 (16)	7 (6)	22 (19)	19 (17)	21 (19)	26 (23)
Goop, gak, Oobleck	62 (56)	20 (18)	15 (13)	7 (6)	5 (4)	2 (2)
Shaving cream	32 (28)	27 (24)	34 (30)	12 (11)	8 (7)	0 (0)
Paint	2 (2)	0 (0)	18 (16)	19 (17)	42 (37)	33 (29)
Rubbings	40 (35)	31 (27)	28 (25)	6 (5)	5 (4)	3 (3)
Chalk	17 (15)	6 (5)	36 (32)	16 (14)	12 (10)	27 (24)
Color mixing	24 (21)	16 (14)	26 (23)	21 (19)	16 (14)	9 (8)

Table 5 (continues)

Frequencies for Teacher Ratings of Use of Sensory Experiences in the Classroom (N = 115)

Sensory Experience	Never n (%)	1-2 x Year n (%)	1-2 x Month n (%)	Once a Week n (%)	Several times a week n (%)	Daily n (%)
Fine motor tools	10 (9)	1 (1)	10 (9)	10 (9)	24 (21)	59 (52)
Smell jars	51 (45)	28 (25)	22 (20)	3 (3)	2 (2)	6 (5)
Cooking	41 (36)	21 (18)	33 (29)	16 (14)	3 (3)	0 (0)
Tasting	17 (15)	14 (12)	48 (42)	20 (17)	7 (6)	8 (7)
Distinguishing temperature	26 (23)	16 (14)	29 (25)	7 (6)	14 (12)	22 (19)
Distinguishing sounds	19 (16)	12 (10)	25 (22)	12 (10)	21 (18)	25 (22)
Distinguishing materials/ objects/textures in a bag	25 (22)	20 (17)	28 (24)	17 (15)	15 (13)	10 (9)
Visual displays	2 (2)	3 (3)	2 (2)	5 (4)	15 (13)	88 (76)
Flashlights/Shadowing	30 (26)	34 (30)	28 (24)	8 (7)	9 (8)	6 (5)
Soft lighting	22 (20)	9 (8)	7 (6)	6 (5)	12 (11)	55 (49)
Listening to music	0 (0)	0 (0)	0 (0)	1 (1)	7 (6)	107 (93)
Singing	0 (0)	0 (0)	1 (1)	2 (2)	7 (6)	105 (91)

Table 5 (continued)

Frequencies for Teacher Ratings of Use of Sensory Experiences in the Classroom (N = 115)

Sensory Experience	Never n (%)	1-2 x Year n (%)	1-2 x Month n (%)	Once a Week n (%)	Several times a week n (%)	Daily n (%)
Musical/Rhythm instruments	1 (1)	1 (1)	6 (5)	7 (6)	22 (19)	78 (68)
Movement	2 (2)	1 (1)	2 (2)	2 (2)	15 (13)	93 (81)
Rocking chair	33 (29)	1 (1)	4 (3)	2 (2)	4 (3)	70 (61)
Soft materials	1 (1)	2 (2)	1 (1)	2 (2)	8 (7)	101 (88)
Textured manipulatives and materials	14 (12)	7 (6)	27 (24)	11 (10)	13 (12)	40 (36)
Woodworking	76 (70)	13 (12)	9 (8)	2 (2)	2 (2)	7 (6)
Gross motor activities	1 (1)	1 (1)	1 (1)	2 (2)	10 (9)	99 (87)
Nature experiences	3 (3)	10 (9)	27 (23)	24 (21)	23 (20)	28 (24)

Teachers' Perceived Barriers to Providing Sensory Experiences

Participants were asked to rate identified barriers to providing sensory experiences in the classroom (Not At All to Very Much). The strongest barriers to providing sensory activities were: time constraints (49% somewhat), money (42% somewhat), health and safety concerns (25% very much, 40% somewhat), hygiene (22% very much) and space constraints (22% very much). In general, teachers reported that many of the potential barriers to providing sensory experiences in the classroom were “not at all” barriers. Means, standard deviations, and ranges for teacher ratings of barriers to providing sensory activities in the classroom can be found in Table 6. Frequencies for teacher ratings of barriers to providing sensory activities in the classroom can be found in Table 7.

Participants were also asked to list (question #56) any other barriers they faced in using sensory materials and activities in the classroom. Several teachers identified child behaviors such as hyper activity, and negative behaviors like throwing and breaking, and children putting things in their mouths as barriers. Another teacher stated that getting other teachers interested in using sensory materials was a barrier. Finally, two teachers commented on the fact that they were the only teacher in the classroom and such activities usually leave a mess that would require help cleaning up.

Relationships among Teacher Characteristics and Use of Sensory Experiences

Two one-way ANOVA's were conducted to examine differences in use of sensory activities by teacher characteristics (years teaching in early childhood programs; level of education). Sensory activities served as the dependent variables. The 33 activities were condensed to 7 composite sensory activity variables. The *sensory table* composite

Table 6

Means, Standard Deviations, and Ranges for Teacher Ratings of Barriers to Providing Sensory Activities in the Classroom (N = 115)

Barrier	Mean	\pm SD	Range *
Administrators	0.42	.68	0—2
School policy	0.55	.74	0—2
Hygiene	0.76	.79	0—2
Health and safety concerns	0.89	.77	0—2
Money	0.76	.72	0—2
Upkeep of materials	0.69	.75	0—2
Lack of equipment	0.70	.74	0—2
Time constraints	0.81	.69	0—2
Space constraints	0.82	.77	0—2
Personnel constraints	0.50	.70	0—2
Parent opposition	0.38	.63	0—2
Cultural beliefs	0.25	.58	0—2
Personal beliefs/preferences	0.32	.60	0—2
Curriculum demands	0.45	.72	0—2
* 0 = Not at all 1= Somewhat 2= Very Much			

Table 7

Frequencies for Teacher Ratings of Barriers to Providing Sensory Experiences (N=115)

Barrier	Not at All n (%)	Somewhat n (%)	Very Much n (%)
Administrators	78 (68)	24 (21)	12 (10)
School policy	68 (60)	28 (25)	17 (15)
Hygiene	53 (46)	37 (32)	25 (22)
Health and safety concerns	40 (35)	46 (40)	28 (25)
Money	46 (41)	48 (42)	19 (17)
Upkeep of materials	54 (48)	39 (35)	19 (17)
Lack of equipment	53 (46)	43 (37)	19 (16)
Time constraints	40 (35)	56 (49)	18 (16)
Space constraints	46 (40)	44 (38)	25 (22)
Personnel constraints	70 (62)	30 (26)	13 (11)
Parent opposition	80 (70)	26 (23)	9 (8)
Cultural beliefs	94 (82)	13 (11)	8 (7)
Personal beliefs/preferences	86 (75)	20 (17)	8 (7)
Curriculum demands	78 (68)	22 (19)	15 (13)

variable was created by combining the following items: water play, sand, food in sensory table, goop, gak, oobleck, and shaving cream. The *outdoor play* composite variable was comprised of the following items: bubbles, gross motor activities and nature experiences. The *music and movement* composite variable was created by combining the following items: listening to music, singing, musical/rhythm instruments, movement and rocking chair. The *art materials and activities* composite variable included the following items: food in art, playdough/clay/bread dough, paint, rubbings, chalk, color mixing, fine motor tools, and woodworking. The *taste/ smell* composite variable included the following items: smell jars, cooking and tasting. The *visual stimulation* composite variable included the following items: visual flashlights/shadowing, and soft lighting. The *distinguish differences* composite variable included: distinguishing temperature, sounds, materials/objects/textures in a bag, soft material and textured manipulatives and materials. Means, standard deviations, and ranges for composite sensory variables can be found in Table 8.

No significant differences in use of sensory activities by years of teaching experience (grouped by quartiles) were found. However, a one-way ANOVA revealed significant differences in use of taste/smell activities by level of education (see Table 9). Post-hoc analyses using a Bonferroni adjustment indicated that teachers with a two-year degree reported using taste/smell activities more frequently ($M = 6.00$; $SD = 2.86$) than teachers with a graduate degree ($M = 1.00$; $SD = 1.00$). It should be noted that while the overall ANOVA was significant ($p < .05$), post-hoc analyses of between group differences approached significance at the $p < .05$ level, with significance at the $p < .10$ level.

Table 8

Means, Standard Deviations, and Ranges for Composite Sensory Variables: Use of Sensory Experiences (N = 115)

Sensory Experience	Mean	\pm SD	Range
Sensory table activities	8.82	2.39	2—15
Outdoor play activities	10.88	4.94	0—20
Music & movement	22.25	3.15	12—25
Art materials & activities	18.52	7.92	0—37
Taste/smell activities	4.50	2.97	0—12
Visual stimulation	9.37	3.13	0—15
Distinguishing differences	14.79	5.10	1—25

Table 9

One-way Analysis of Variance Summary for Use of Taste/Smell Sensory Activities: Two-year Degree vs. Graduate Degree (N=115)

Source	df	SS	MS	F
Between groups	5	114.08	22.82	2.79*
Within group	105	857.67	8.17	
Total	110	971.75		

*p<.05

Furthermore, these results should be interpreted with caution due to the low number of cases in the “graduate degree” group ($n=3$). After examining the data collected, the sample size did not allow for statistical comparisons that support or contradict the hypothesis that teachers who hold degrees in early childhood or child development were more likely to use sensory experiences on a more frequent basis.

CHAPTER V

DISCUSSION

Teachers' Perceptions of the Importance of Sensory Experiences

The purpose of this study was to provide much-needed research documenting teachers' use of sensory experiences with young children. Until now, little was known about teachers' perceptions of the importance of sensory activities or their use of sensory materials in the classroom. Existing research supports the idea that teachers' beliefs/perceptions influence their practice. The majority of teachers in the study reported that it is "very important" to provide sensory experiences and activities to young children. It is also interesting to note that most of the teachers reported attending workshops/trainings about using sensory activities in the classroom. Yet, after examining frequency of use of sensory experiences and activities in the classroom, teachers reported that they were not providing a variety of sensory experiences in the classroom. Experiences provided by the majority of teachers tend to be limited to the areas of music and movement, art materials and activities, distinguishing differences, and outdoor play activities. Areas least utilized were visual stimulation, sensory table activities, and taste/smell activities. McMullen (1999) also found a discrepancy in what teachers reported as perceptions/beliefs and what they practiced in the classroom. He attributed the discrepancy to environmental or work-related stresses impacting implementation. In the present study, teachers reported space,

money, time constraints, and health and safety concerns as barriers to providing sensory experiences, thus potentially impacting their practice.

Frequency and Type of Sensory Activities Provided in the Classroom

Next, the study explored how frequently teachers provide sensory experiences in their classrooms and what kinds of sensory experiences and materials they provide. In standards affirmed by the National Association for the Education of Young Children (NAEYC), sand, water, play dough, paint, and blocks are listed as sensory materials that should be available indoors and outdoors for children throughout the day. Participants reported that sand, water, and paint were offered one to two times per month. Play dough was most likely to be offered daily. This is disappointing in that the data suggests that early childhood teachers continue to struggle to implement national and state standards and guidelines on a daily basis. This translates into lost opportunities to provide hands-on, active learning experiences, where children actively construct physical, social, and logico-mathematical knowledge, as suggested by Kamii and Ewing (1996).

Teachers' Perceived Barriers to Providing Sensory Experiences

The current study also provided valuable documentation of teachers' perceived barriers/challenges to providing sensory experiences. Two challenges to providing sensory experiences that were identified by teachers as "very much" a barrier included health/safety concerns and hygiene. Health/safety concerns and hygiene can be addressed through training, discussion of supervision, and proper hand washing to limit the spread of disease. Time constraints were reported to be "somewhat" of a barrier by a large number of teachers. Classroom schedules and routines must be adjusted to allow children to explore the learning environment uninterrupted. Contrary to previous research

(Buchanan et al., 1998; Stipek & Byler, 1997), administration and school policy were not considered barriers to providing sensory experiences by most of the participants in the current study.

Relationships among Teacher Characteristics and Use of Sensory Experiences

Finally, the study examined: “How are teacher characteristics and use of sensory activities related?” Although there was no relationship between years of teaching experience and use of sensory experiences, there was a difference in teachers’ use of taste/smell activities by teachers’ level of education. Specifically, teachers with a two-year degree were more likely to use taste/smell activities than teachers with a graduate degree. Existing research (Cassidy et al., 1995) suggests that teachers with more education in Early Childhood/Child Development are more likely to use developmentally appropriate practices, such as providing sensory experiences. Differences by level of education may be accounted for in that teachers with graduate degrees listed deaf education, elementary education, and an unspecified education as their areas of study. The majority of two-year degreed teachers studied early childhood education and child development. It could be speculated that teachers with a two-year degree were more likely to have covered developmentally appropriate practices utilizing hands-on, active learning activities in their coursework than teachers with a graduate degree.

The study offered insight into teachers’ perceptions of importance and use of sensory experiences in the classroom. It also generated an even bigger question. As previously discussed, teachers overwhelmingly reported that in general, they felt that it was “very important” to provide sensory experiences in the classroom. Thus it would be expected that teachers would provide sensory experiences on a frequent basis. However,

teacher reports of provision of a variety of sensory experiences were low. Furthermore, teachers reported very few barriers to providing sensory experiences and activities. Therefore, it is perplexing as to why teachers are not providing various sensory experiences when they regard them as important and do not feel there are strong barriers to providing activities. This leads one to speculate that perhaps the content of training/workshops may not be adequate to train teachers in classroom management and implementation of various sensory experiences, without follow-up mentoring. Also, high teacher-child ratios may impede the provision of sensory-rich experiences.

Limitations

Although the response rate of schools that agreed to participate was high (67%), the *overall* response rate of schools targeted for participation in the study was low (7%). Thus one limitation of the present study is sample size, and in turn, representativeness of the sample. It is likely that schools with directors who actively support their teachers and the professional growth of their staff encouraged participation in the study. Therefore, the data gathered only represent the perspectives of teachers from less than 10% of the schools in the greater metropolitan area. Finally, the number of teachers who possessed a graduate degree was only three. Thus, the analyses using teacher level of education as a predictor variable must be interpreted with some caution.

Implications

This study suggests a number of implications for practice. First, workshops and training sessions should encourage early childhood educators to embrace developmentally appropriate practices, including the use of sensory activities, thereby increasing teacher knowledge and ability to provide learning environments filled with

opportunities for children to be actively involved in constructing knowledge. Second, teacher training and professional development programs need to address teachers' perceptions of barriers to providing sensory experiences and materials. This can be accomplished by encouraging teachers to reflect on their beliefs of developmentally appropriate practice and use of sensory experiences. This may help to eliminate the conflict between teacher perceptions/beliefs and what they practice in the classroom. Third, training should be followed up with a session to discuss progress and impact on classroom practice and share how experiences and activities were accomplished. Fourth, teachers should develop ways to utilize floater staff and volunteers to aid in supervision of the classroom while sensory experiences and activities are provided. This will allow for crucial teacher-child interaction. Having additional people in the classroom will also help facilitate the progress of clean up. Finally, teachers, directors, and administrators need to discuss and formulate a plan to not only fully integrate sensory experiences into the curriculum, but to modify daily schedules and routines to allow ample time to explore sensory-rich learning environments and become fully engaged in sensory activities.

Future Research Directions

Future research on the use of sensory activities and materials in early childhood programs should be encouraged. An expanded study may offer additional information as to why teachers are not providing a variety of sensory experiences and activities in the classroom. Participant recruitment at national early childhood conventions and workshops may provide a broader participant pool. An observation component can be added to obtain information as to how teacher-child interaction plays a role in the use of sensory experiences.

Further research into sensory experiences may also aid teachers in addressing early learning standards and observing children's progress in many areas of development. Sensory activities and materials can be used as a vital tool in facilitating academic assessment and linking such activities to developmental domains. As accountability through assessment at younger and younger ages moves closer, it becomes increasingly important to identify effective ways to assess children's growth and development over time, in their natural environment. By incorporating uses of sensory activities and materials, early childhood educators can enrich their classroom environments and in turn the learning experiences of young children.

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APPENDIX A

Director Information Letter

A Research Study about Sensory Activities in the Early Childhood Classroom

Investigator:

Pamela Goodwin, B.S., Principal Investigator

Amy L. Halliburton, Ph.D., Project Advisor

Purpose:

In partial fulfillment of the requirements for the Master of Science degree in Early Childhood Education at OSU-Tulsa. I am interested in understanding more about using sensory materials (e.g., sand table, water play, bubbles, fingerpainting, singing, dancing) in the early childhood classroom.

Procedures:

As a participant in this research study, the teaching staff at your center will be asked to complete a questionnaire that will only be given to early childhood teachers in _____, Oklahoma. The topic is sensory experiences. The questionnaire will be distributed at the school at the beginning of the week, and should take 15 minutes to complete. A letter describing the project will be given to teacher along with the questionnaire. The letter will explain that participation is completely voluntary and that returning the questionnaire in the envelope provided indicates their willingness to participate. As Director if you would allow your center to participate in the study, please e-mail a list of the names of your staff grouped by classroom to pamela.goodwin@okstate.edu so that I may compile the survey packets. At the conclusion of the study you will receive a report detailing the results of the study as well as a specific report of your center. I will deliver and pick up the packets.

Risks of Participation:

There are no known risks associated with this project that are greater than those ordinarily encountered in daily life.

Benefits:

The benefits will be an enhanced understanding of the use of sensory experiences in early childhood classrooms, which can in turn inform curriculum and planning.

Confidentiality:

The records of this study will be kept private. Any written results will discuss group findings and will not include information that will identify you. Research records will be stored securely and only researchers and research oversight staff will have access to the records. It is possible that the consent process and data collection will be observed by research oversight staff responsible for safeguarding the rights and well-being of people who participate in research. The surveys and data will be destroyed after two years.

Compensation:

There is no compensation for participation in this study.

Contacts:

For information concerning this study, contact Dr. Amy Halliburton (918.594.8169) or Pamela Goodwin (918.744.9432). For information on participants' rights, contact Dr. Sue Jacobs, IRB Chair, 219 Cordell North, Stillwater, OK, 74078; 405.744.1676 or irb@okstate.edu.

Participant Rights:

Your agreement to participate in this study is voluntary, and you can discontinue participation at any time without reprisal or penalty. Returning the questionnaire in the sealed envelope will indicate your willingness to participate in this project. Please feel free to ask any questions you have regarding any part of the study.

APPENDIX B

Teacher Information Letter

A Research Study about Sensory Activities in the Early Childhood Classroom

Investigator:

Pamela Goodwin, B.S., Principal Investigator Amy L. Halliburton, Ph.D., Project Advisor

Purpose:

As partial fulfillment of the requirements for the Master of Science in Early Childhood Education at OSU-Tulsa. I am interested in understanding more about using sensory materials (e.g., sand table, water play, bubbles, fingerpainting, singing, dancing) in the early childhood classroom.

Procedures:

As a participant in this research study, you will be asked to complete a questionnaire that will only be given to early childhood teachers in _____, Oklahoma. The topic is sensory experiences. The questionnaire will be distributed at the school at the beginning of the week and should take 15 minutes to complete. Please put your completed questionnaire in the envelope provided, seal it, and return it by the end of the week to your Director. Please be assured that there are no right or wrong answers to any of the questions.

Risks of Participation:

There are no known risks associated with this project that are greater than those ordinarily encountered in daily life.

Benefits:

The benefits will be an enhanced understanding of the use of sensory experiences in early childhood classrooms, which can in turn inform curriculum and planning.

Confidentiality:

The records of this study will be kept private. Any written results will discuss group findings and will not include information that will identify you. Research records will be stored securely and only researchers and research oversight staff will have access to the records. It is possible that the consent process and data collection will be observed by research oversight staff responsible for safeguarding the rights and well-being of people who participate in research. The surveys and data will be destroyed after two years.

Compensation:

There is no compensation for participation in this study.

Contacts:

For information concerning this study, contact Dr. Amy Halliburton (918.594.8169) or Pamela Goodwin (918.744.9432). For information on participants' rights, contact Dr. Sue Jacobs, IRB Chair, 219 Cordell North, Stillwater, OK, 74078; 405.744.1676 or irb@okstate.edu.

Participant Rights:

Your agreement to participate in this study is voluntary, and you can discontinue participation at any time without reprisal or penalty. Returning the questionnaire in the sealed envelope will indicate your willingness to participate in this project. Please feel free to ask any questions you have regarding any part of the study.

APPENDIX C

Teacher Questionnaire

Teacher Background Information

Please take a few minutes and provide us with some basic information about who you are.

Age: _____ **Sex:** _____ Female _____ Male

Marital Status: _____ Single (never married)
_____ Single (separated, divorced or widowed)
_____ Married or single with partner

Ethnicity: _____ African American _____ Asian or Pacific Islander
_____ Biracial or Multiracial _____ Caucasian
_____ Hispanic/ Latino _____ Native American

Educational Background: Please indicate the highest level of education you have completed. Indicate field of study for each completed degree.

_____ Less than high school
_____ High school/ GED
_____ Vocational school
_____ Some college
_____ Two-year college → Please indicate field of study: _____
_____ Four-year college → Please indicate field of study: _____
_____ Some graduate college
_____ Graduate degree → Please indicate field of study: _____

Certification:

Please indicate Oklahoma State Dept. of Education certifications you hold (check all that apply):
_____ ECE _____ Elementary (K—8) _____ Special Ed _____ Other (list): _____

Do you hold a CDA Credential? Yes No

If yes, indicate type of CDA Credential: _____ Infant/Toddler _____ Preschool

Do you hold a CDA Certificate of Mastery? Yes No

Teaching Experience:

How many years have you taught children of **any age**, including this year? _____

How many years have you taught infants & toddlers, including this year? _____

Classroom Information:

Please indicate the age range of the children you currently teach: _____

Number of children in your class this year: _____

Current class type (circle one): Single-age Mixed-age

Besides you, how many adults are currently in your classroom? _____

Do you currently teach in an Early Head Start classroom? Yes No

Do you currently teach in a Head Start classroom? Yes No

Professional Development:

Have you attended any workshops/trainings about brain development? Yes No

Have you attended any workshops/trainings about using sensory activities in the classroom?

Yes No

Sensory Experiences in the Classroom

Underneath each item listed below, circle the answer that best describes how often you provide those materials/activities to children in your classroom.

1. Water play

Never 1-2 x/year 1-2 x/month Once a week Several times/week Daily

2. Bubbles

Never 1-2 x/year 1-2 x/month Once a week Several times/week Daily

3. Sand

Never 1-2 x/year 1-2 x/month Once a week Several times/week Daily

4. Food in sensory table (e.g., cornmeal, sand, flour, pinto beans, rice)

Never 1-2 x/year 1-2 x/month Once a week Several times/week Daily

5. Food in art (e.g., paint & oatmeal; paint & salt)

Never 1-2 x/year 1-2 x/month Once a week Several times/week Daily

6. Playdough/Clay/Bread dough

Never 1-2 x/year 1-2 x/month Once a week Several times/week Daily

7. Goop, gak, Oobleck

Never 1-2 x/year 1-2 x/month Once a week Several times/week Daily

8. Shaving cream

Never 1-2 x/year 1-2 x/month Once a week Several times/week Daily

9. Paint (e.g., fingerpainting, sponge painting, roller painting, etc.)

Never 1-2 x/year 1-2 x/month Once a week Several times/week Daily

10. Rubbings (e.g., tree rubbings, leaf rubbings)

Never 1-2 x/year 1-2 x/month Once a week Several times/week Daily

11. Chalk

Never 1-2 x/year 1-2 x/month Once a week Several times/week Daily

12. Color mixing

Never 1-2 x/year 1-2 x/month Once a week Several times/week Daily

13. Fine motor tools (e.g., scissors, crayons, colored pencils)

Never 1-2 x/year 1-2 x/month Once a week Several times/week Daily

14. Smell jars	Never	1-2 x/year	1-2 x/month	Once a week	Several times/week	Daily
15. Cooking	Never	1-2 x/year	1-2 x/month	Once a week	Several times/week	Daily
16. Tasting	Never	1-2 x/year	1-2 x/month	Once a week	Several times/week	Daily
17. Distinguishing temperature (e.g., hot/cold)	Never	1-2 x/year	1-2 x/month	Once a week	Several times/week	Daily
18. Distinguishing sounds (e.g., sound cans)	Never	1-2 x/year	1-2 x/month	Once a week	Several times/week	Daily
19. Distinguishing materials/objects/textures in a bag (e.g., “Feely bags”)	Never	1-2 x/year	1-2 x/month	Once a week	Several times/week	Daily
20. Visual displays (e.g., children’s artwork, art, photographs, picture books)	Never	1-2 x/year	1-2 x/month	Once a week	Several times/week	Daily
21. Flashlights/Shadowing	Never	1-2 x/year	1-2 x/month	Once a week	Several times/week	Daily
22. Soft lighting	Never	1-2 x/year	1-2 x/month	Once a week	Several times/week	Daily
23. Listening to music	Never	1-2 x/year	1-2 x/month	Once a week	Several times/week	Daily
24. Singing	Never	1-2 x/year	1-2 x/month	Once a week	Several times/week	Daily
25. Musical/Rhythm instruments	Never	1-2 x/year	1-2 x/month	Once a week	Several times/week	Daily
26. Movement (e.g., dance)	Never	1-2 x/year	1-2 x/month	Once a week	Several times/week	Daily
27. Rocking chair	Never	1-2 x/year	1-2 x/month	Once a week	Several times/week	Daily
28. Soft materials (e.g., pillows, stuffed animals, soft blocks, fabric books)	Never	1-2 x/year	1-2 x/month	Once a week	Several times/week	Daily

29. **Textured manipulatives and materials** (e.g., velvet, burlap, flannel board, sandpaper)
 Never 1-2 x/year 1-2 x/month Once a week Several times/week Daily

30. **Woodworking**

Never 1-2 x/year 1-2 x/month Once a week Several times/week Daily

31. **Gross motor activities** (e.g., push, pull, climb)

Never 1-2 x/year 1-2 x/month Once a week Several times/week Daily

32. **Nature experiences**

Never 1-2 x/year 1-2 x/month Once a week Several times/week Daily

33. Besides the items listed above, what other sensory experiences do you provide in your classroom?

Importance of Sensory Experiences

Circle the answer that best reflects your response to the following questions:

34. **In general**, how important is it for teachers to provide sensory experiences and activities to young children?

Very Important Somewhat Important Not Very Important Unimportant

35. How important is it for teachers to provide sensory experiences through **sensory table activities?** (e.g., sand, water)

Very Important Somewhat Important Not Very Important Unimportant

36. How important is it for teachers to provide sensory experiences through **outdoor play activities?**

Very Important Somewhat Important Not Very Important Unimportant

37. How important is it for teachers to provide sensory experiences through **music & movement?**

Very Important Somewhat Important Not Very Important Unimportant

38. How important is it for teachers to provide sensory experiences through **art materials and activities?**

Very Important Somewhat Important Not Very Important Unimportant

39. How important is it for teachers to provide sensory experiences through **taste/smell activities?**

Very Important Somewhat Important Not Very Important Unimportant

40. How important is it for teachers to provide sensory experiences through **visual stimulation?**

Very Important Somewhat Important Not Very Important Unimportant

41. How important is it for teachers to provide sensory experiences through **activities that help children distinguish differences?** (e.g., distinguishing sounds, temperature, textures)

Very Important Somewhat Important Not Very Important Unimportant

Barriers to Providing Sensory Experiences

Circle the answer that best describes how much each of the following items is a barrier to providing sensory materials and activities in your classroom:

42. Administrator(s)	Not at all	Somewhat	Very Much
43. School policy	Not at all	Somewhat	Very Much
44. Hygiene (e.g., cleanliness issues)	Not at all	Somewhat	Very Much
45. Health and safety concerns	Not at all	Somewhat	Very Much
46. Money (e.g., purchasing materials)	Not at all	Somewhat	Very Much
47. Upkeep of materials	Not at all	Somewhat	Very Much
48. Lack of equipment	Not at all	Somewhat	Very Much
49. Time constraints	Not at all	Somewhat	Very Much
50. Space constraints	Not at all	Somewhat	Very Much
51. Personnel constraints	Not at all	Somewhat	Very Much
52. Parent opposition	Not at all	Somewhat	Very Much
53. Cultural beliefs	Not at all	Somewhat	Very Much
54. Personal beliefs/preferences	Not at all	Somewhat	Very Much
55. Curriculum demands	Not at all	Somewhat	Very Much

56. Please list any other barriers you face to using sensory materials and activities in your classroom:

THANK YOU!

APPENDIX D

IRB Approval Letter

Oklahoma State University Institutional Review Board

Date: Thursday, December 06, 2007
IRB Application No HE0780
Proposal Title: Sensory Experiences in the Early Childhood Classroom

Reviewed and Exempt
Processed as:

Status Recommended by Reviewer(s): Approved Protocol Expires: 12/5/2008

Principal
Investigator(s)

Pamela Goodwin
3304 S. Allegheny Ave
Tulsa, OK 74135

Amy Halliburton
OSU Tulsa 1114 Main Hall
Tulsa, OK 74106

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

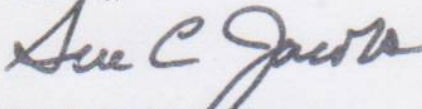
☒ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,



Sue C. Jacobs, Chair
Institutional Review Board

VITA

Pamela McManus Goodwin

Candidate for the Degree of

Master of Science

Thesis: SENSORY EXPERIENCES IN THE EARLY CHILDHOOD CLASSROOM:
TEACHERS' USE OF ACTIVITIES, PERCEPTIONS OF THE
IMPORTANCE OF ACTIVITIES, AND BARRIERS TO
IMPLEMENTATION

Major Field: Early Childhood Education

Biographical:

Personal Data:

Education:

Oklahoma State University, Stillwater, Oklahoma, Master's of Arts, May 2008.
Mars Hill College, Mars Hill, NC, Bachelor of Music Education, May 1984.

Experience:

Executive Director, Trinity Episcopal Day School, Tulsa, OK. 2007 – Present
Community Action Project of Tulsa County (CAPTC), 2002-2007

Office Coordinator, St. Francis Hospital, Ave Maria House, Tulsa, OK
2000-2002

Teacher, Kinder Care Learning Centers, Inc., Tulsa, OK. 1998-2000

Music Teacher, CFS Kids, Inc., Tulsa, OK. 1996-1998

Professional Memberships:

National Association for the Education of Young Children (NAEYC)

Early Childhood Association of Oklahoma

Oklahoma Association for Infant Mental Health

Golden Key International Honor Society

Name: Pamela McManus Goodwin

Date of Degree: May 2008

Institution: Oklahoma State University

Location: Tulsa, Oklahoma

Title of Study: SENSORY EXPERIENCES IN THE EARLY CHILDHOOD
CLASSROOM: TEACHERS' USE OF ACTIVITIES, PERCEPTIONS
OF THE IMPORTANCE OF ACTIVITIES, AND BARRIERS TO
IMPLEMENTATION

Pages in Study: 66

Candidate for the Degree of Master of Science

Major Field: Early Childhood Education

Scope and Method of Study: The purpose of this study was to provide much-needed research documenting teachers' use of sensory experiences with young children. Participants in the study responded to a survey about demographic information, frequency of sensory experiences in the classroom, perceptions of the importance of sensory activities and barriers to providing sensory experiences. Data was entered into SPSS and descriptive analyses, including means, standard deviations, ranges, and frequencies were used. Two one-way ANOVA's were run to test for differences in use of sensory activities by teacher experience and level of education.

Findings and Conclusions: Teachers reported that in general, it is "very important" to provide sensory experiences and activities in the classroom. Sensory experiences that teachers reported providing most frequently included: listening to music, singing, soft materials, and gross motor activities. Identified barriers/challenges to providing sensory experiences were health and safety concerns and hygiene. No significant differences in use of sensory activities by years of experience or levels of education were found.

Further research is needed to provide additional information and shed light on why teachers are not providing sensory experiences and activities in the classroom. Additional research can also explore how sensory experiences can be used as a vital tool in facilitating academic assessment. This would aid in identifying and developing effective ways to assess a child's growth and development over time, in their natural environment.

ADVISER'S APPROVAL: Dr. Amy Halliburton
